

SIZE AND DIET OF *BUFO MARINUS* IN RAINFOREST OF NORTHEASTERN QUEENSLAND. *Memoirs of the Queensland Museum* 34(1):240. 1993:- The widespread occurrence of the exotic *Bufo marinus* in open habitats and its feeding strategies there are well documented (e.g. Freeland, 1984). Not studied so well are patterns of occurrence and diet of *B. marinus* in rainforest.

Between Dec., 1985 and Jan., 1986, at two predominantly rainforested sites, we collected, measured and examined gut contents of 257 specimens of *B. marinus*. Site 1, 'Carbine Uplands' is a traverse of 22.4km through notophyll vine forest along the Mt Lewis Forestry Rd. Site 2, 'Daintree Lowlands' is the 52.4km road from Noah Ck to Bloomfield (incorporating the years old section from Cape Tribulation to Bloomfield). This runs mainly through mesophyll vine forest, but includes cleared and open-forested tracts. At site 1, 102 specimens were obtained; at site 2, 155. Size-class distribution and gut contents (Table 1) of *B. marinus* collected from the two sites during 235 person-hours (between 2000 and 0350hrs) are compared.

A comparison of frequency distributions of snout-urostyle length reveal differences between samples from the two sites. The Carbine Uplands sample was essentially normally distributed around a mean adult length <10cm, suggesting an established population which is in equilibrium with its resource base, along the lower section of traverse to an upper altitudinal limit of ca 900m. That from site 2 clearly exhibited a positive skew around a mean length >10cm and indicates greater numbers of large adult toads (usually females - the largest measuring 19.8cm). Because the second site comprised a 52.4km traverse, of which 32.4km was the new Cape Tribulation-Bloomfield section, this difference can be interpreted as evidence of an invading or pioneering population, where larger sizes are attained due to exploitation of resources that had not been utilised formerly by toads. This is consistent with the work of Freeland (1984) in the Gulf of Carpentaria lowlands. It also supports the view that the newly constructed road acted as a route of 'infection', for toads (with other exotics) into rainforest.

Analysis of stomach contents confirms previous work (eg, Mungomery, 1936; van Beurden, 1980; Strussmann et al., 1984; Freeland et al., 1986), showing consumption of a wide range of invertebrates, but a clear preference for ants and beetles. Notable also is the ingestion of arachnids (both spiders and scorpions), and scolopendromorph centipedes, indicating resilience of *B. marinus* to their venoms. A Chi² test (at $p_{crit.} = 0.001$), shows significant differences between diets of toads at the two sites (more oligochaetes, diplopods, collembolans and curculionids in the upland rainforest vs more slugs, orthopterans and homopterans in the lowlands). Both populations appear to be foraging similarly, largely as predators of arthropods and other invertebrates. In so doing, *B. marinus* is a competitor of native anurans and other small vertebrates. Only one instance of vertebrate prey (a road-killed *B. marinus* being cannibalised) was recorded during the survey. This was one of only three such instances in surveys over 4 summers, between 1985-1989. The others were specimens of *Ramphotyphlops* sp., and *Rana daemeli*, a juvenile.

Acknowledgements

Supported by grants from the Rector of the University

TABLE 1. Diet of *Bufo marinus* from two rainforest sites, NEQ.

Prey Item	Percentage of stomachs containing prey items			
	Site 1	Site 2	Total	Sig. Diff. $p > 0.001$
Earthworms	12.7	3.9	7.4	yes
Snails	11.8	5.8	8.2	—
Slugs	0.9	11.6	7.4	yes
Scorpions	1.9	4.5	3.4	—
Spiders	12.7	17.4	15.6	—
Harvestmen	11.8	10.9	11.3	—
Slaters	4.9	3.9	4.3	—
Millipedes	36.3	21.3	27.3	yes
Centipedes	11.8	12.3	12.1	—
Springtails	11.8	1.9	5.8	yes
Cockroaches	10.8	22.6	17.9	—
Crickets/Katydid	22.5	36.1	30.7	yes
Earwigs	4.9	8.4	7.0	—
Termites	6.8	4.5	5.4	—
Bugs	3.9	7.1	5.8	—
Leafhoppers/Cicadas	0.9	6.5	4.2	yes
Butterfly/Moth larvae	9.8	11.6	10.9	—
Beetles (excl. weevils)	86.2	67.7	75.1	—
Weevils	52.9	30.9	39.7	yes
Ants (other)	79.4	73.5	75.9	—
Bull Ants	26.5	—	10.5	—
Green Tree Ants	—	22.5	13.6	—
Vertebrates	—	0.6*	0.4	—
Mineral	56.9	26.5	38.5	yes
Plant	60.8	67.7	65.0	yes
(Nematode parasitism)	7.8	12.9	10.9	—
Number	102	155	257	—

* single record, road-killed *B. marinus*

College, University of New South Wales, Australian Defence Forces Academy.

Literature cited

- Freeland, W. J. 1984. Size of a *Bufo marinus* population around a waterhole in the dry season. Unpublished manuscript, Conservation Commission of the Northern Territory, 12 Pp.
- Freeland, W. J., Delvinquier, L. J. & Bonnin, B. 1986. Decline of Cane Toad, *Bufo marinus*, populations: Status of urban toads. *Australian Wildlife Research*, 13: 597-601.
- Mungomery, R. W. 1936. A survey of the feeding habits of the giant toad (*Bufo marinus* L.) and notes on its progress since its introduction into Queensland. *Proceedings of the Queensland Society of Sugar Cane Technology*: 63-74.
- Strussmann, C., do Vale, M. B. R., Meneghini, M. H. & Magnusson, W. E. 1984. Diet and foraging mode of *Bufo marinus* and *Leptodactylus ocellatus*. *Journal of Herpetology*, 18(2): 138-146.
- van Beurden, E. K. 1980. Report on the results of Stage 3 of an ecological and physiological study of the Queensland Cane Toad *Bufo marinus*. Unpub. Report to Australian National Parks & Wildlife Service, Canberra, pp. 86-152.

G.L. Werren, c/- Douglas Shire Council, PO Box 357, Mossman, Queensland 4873; M.P. Trenerry, 4/14 Casella St, Earlville, Queensland, 4870.